Journal of the Franklin Institute Vol 5 (third Series, Vol 29) Phila 1855

use too much water-glass in moistening the wall.] This operation is usually performed with a brush. The wall must be left in such a condition as to be capable of receiving colors when afterwards painted on. If, as frequently happens, the wall has been too strongly fixed, the surface has to be removed with pumice, and to be fixed again. Being fixed in this manner, the wall is suffered to dry. Before the painter begins, he moistens the part on which he purposes to work with distilled water squirted on by a syringe. He then paints; if he wishes to repaint a part, he moistens again. As soon as the picture is finished, it is syringed over with water-glass. After the wall is dry, the syringing is continued as long as a wet sponge can remove any of the color. An efflorescence of carbonate of soda sometimes appears on the picture soon after its completion. This may either be removed by syringing with water, or may be left to the action of the atmosphere."

Not to dwell on the obvious advantages possessed by the stereochrome over the real fresco (such as its admitting of being retouched and its dispensing with joinings), it appears that damp and atmospheric influences, notoriously destructive of real fresco, do not injure pictures executed by this process.

The following crucial experiment was made on one of those pictures. It was suspended for twelve months in the open air, under the principal chimney of the New Museum; at Berlin; "during that time, it was exposed to sunshine, mist, snow, and rain," and nevertheless "retained its full brilliancy of color."

The stereochrome has been adopted on a grand scale by Kaulbach in decorating the interior of the great national edifice at Berlin, already alluded to. These decorations are now in progress, and will consist of historical pictures (the dimensions of which are 21 feet in height and 2[illegible] in width), single colossal figures, friezes, arabesques, chiaro scuro, &c. On the effect of the three finished pictures, it has been remarked by one whose opinion is entitled to respect, that they have all the brilliancy and vigor of oil paintings, while there is the absence of that dazzling confusion which new oil paintings are apt to present, unless they are viewed in one direction, which the spectator has to seek for.

---

*On the Composition of the Sheathing of Ships.**

M. Bobierre has paid considerable attention to this subject, and has arrived at the following conclusions as to the cause of the rapid destruction of some copper and bronze sheathing:—1. When unalloyed copper is employed, the presence of arsenic appears to hasten its destruction. 2. All bronzes which appear to have stood well, contained from $4\frac{1}{2}$ to $5\frac{1}{2}$ per cent. of tin, that quantity being necessary to form an homogeneous alloy. When the per centage of tin is only 2·5 to 3·5, which is very frequently the case, no definite alloy is produced, and the mass is of unequal composition, and being unequally acted upon, is soon destroyed. 3. When impure copper is employed, the alloy is never homogeneous, and is unequally acted upon in consequence. We thus see, that the frequent destruction of the sheathing of copper-bottomed vessels arises from the tendency to use inferior brittle copper, and by diminishing the proportion of tin, to economize the difference between the price of that metal and copper, at the same time that the cost of rolling is also less, in consequence of the greater softness of the poor alloy. Bobierre thinks that the addition of a very small portion of zinc very much improves the bronze, by producing a more perfect and uniform distribution of the positive metals, and consequently a much more definite alloy.—*Comptes Rendus*, vol. xxxvii., p. 131, and vol. xxxviii., p. 122.

* From the London Artizan, August, 1854.

---

*The Mints of the United States.** By Professor Wilson.†

The transmissions of gold from the new State of California, have caused a corresponding increase in the gold currency of the States, and have invested the Mint operations with more general interest than under the previous ordinary circumstances they possessed. The same condition of things exists in this country; and as it is intended to establish a mint in the gold producing colony of Australia, I thought it desirable to obtain as much information as I could in reference to the organization and working details of those in the United States.

The head establishment is at Philadelphia, and is called "The Mint;" there are also, three "Branch Mints;"—at New Orleans, in Louisiana; at Charlotte, in North Carolina; and at Dahlonega, in Georgia, respectively. The Branch Mint in California, and the Assay Office in New York, are not yet completely organized.

At the Mint in Philadelphia, gold, silver, and copper, are coined; at New Orleans, gold and silver are coined; while the branches at Charlotte and Dahlonega coin gold only. At "The Mint," the executive staff consists of a director, treasurer, chief coiner, melter and refiner, engraver, assayer, and assistant assayer. At the New Orleans Branch Mint, the staff consists of a superintendent, treasurer, melter and refiner, and coiner; and at each of the other two branch mints there are but three officers,—superintendent and treasurer (combined), assayer, and coiner. The several duties of these officers, the remuneration they shall receive for their services, and the amount of security they shall give for the due performance of them, are duly prescribed by an Act of Congress supplementary to the Act, entitled "An Act establishing a Mint and regulating the Coins in the United States;" this latter Act giving all the details referring directly to the coinage of the country.

At the United States Mint at Philadelphia, the salaries are fixed as follows:—Director, \$3500; treasurer, \$2000; chief coiner, \$2000; melter and refiner, \$2000; assayer, \$2000. At the New Orleans Branch Mint the salaries are, to the superintendent, \$2500, and \$2000 each to the other officers; and at the other branch mints the superintendents receive \$2000, and the other officers \$1500 respectively. In each of the establishments, the appointment of assistants, subordinate officers and

* From the Civil Engineer and Architect's Journal, November, 1854.

† From the Special Report on the New York Industrial Exhibition.

servants, is left entirely in the hands of the chief of the different departments.

In visiting the Mint at Philadelphia I had the advantage of being taken through the several departments by the chief coiner, Mr. Franklin Peale, and the melter and refiner, Professor J. C. Booth, who kindly furnished me with the following details of their operations. As the gold is brought to the Mint in various quantities and in a crude state, it passes necessarily through the department of the refiner before it reaches that of the chief coiner; I therefore give the actual details of the refining operations upon sundry deposits of gold, amounting in the aggregate to $2,000,000.

The deposits are immediately weighed and a certificate of their gross weight issued. The fires having been lighted in the five furnaces of the deposit melting-room at four or five o'clock, A. M., all the deposits, amounting perhaps to seventy or eighty, are melted before noon; assay slips are then taken off, and the assays finished* the next morning, after which their values are calculated by the weight after melting, care being taken to include all the grains that can be procured from the flux, pots, &c., by grinding them up under a pair of small chasers, sifting, and washing. There is a clerk and his assistant and one hand wholly engaged in performing all the weighings for the treasurer, such as weighing deposits before and after melting, ingots for coinage, fine bars, and the clippings after cutting out the planchets. There are five men in the deposit melting-room, two of whom attend to two furnaces each at the same time, one to one furnace and washing grains, and the remaining two are laboring assistants. The whole deposit of $2,000,000 is melted in three or four days in the deposit-room, and assayed by from the third to the seventh day.

As soon as the first deposits are assayed, say on the third day (if expedition is necessary,) or always on the fourth, they are granulated in the proportion of one part of gold to two parts of silver. The pots contain 50 lbs. of gold and 100 lbs. of silver, equal to 1800 oz., and each melt requires about an hour. With four furnaces (attended by four melters and two aids,) there are ordinarily made thirty-two melts per day, but when hurried forty-eight melts can be made, making from one-third of a million to one-half of a million dollars per day. Two days' work, or about $650,000 worth of gold, equal in weight to one ton (avoirdupois weight,) are granulated for a single setting with acid. The granulated metal is charged into large pots, together with pure nitric acid of 39° Beaumé, between the hours of seven and nine A.M. on the sixth day, and steamed for five hours. The pots, made in Germany, are 2 feet in diameter by 2 feet in depth, set in plain wooden vats, lined with $\frac{3}{16}$-inch sheet-lead; a single coil of copper pipe passing around the bottom of the vat blows the steam directly into the water, in which the pots are set to about half their depth.

The vats are arranged in a small house in the middle of the room with a large flue connecting with the chimney-stack, so that when in action the odor of nitrous fumes is scarcely perceptible in the building. The $2,000,000 require about sixty such pots; they are stirred about once

* The mode of assaying is according to the "wet process" of Gay Lussac. This is too well known to need description here.

each hour, say altogether five times, with simple wooden paddles; the next day (seventh,) the acid solution of nitrate of silver is drawn off by a gold-syphon into wooden buckets, and transferred to the large vat, in which it is precipitated by salt (chloride of sodium,) and fresh acid added to the metals, now containing very little silver. Steaming for five hours on the seventh day completes the refining of $650,000. Early on the eighth, one pot is drawn off, washed with a little warm water, and the gold-powder transferred to a filter. Fresh granulations are put into this empty pot, and the acid of the adjoining pot baled over upon them, and thus through the series, the whole being re-charged in from two to two and a half hours. After steaming for five hours, the acid which contained but little silver from the preceding day becomes a nearly saturated solution of nitrate of silver. By this arrangement 4½ lbs. of nitric acid are consumed altogether for each pound of gold refined, and the latter is brought up to 990 a 993 m. fine,—rarely below 990. Thus every two days, 13,000 lbs. of nitric acid are used. In the course of the last year 1,000,000 lbs. of pure nitric acid, at seven cents per pound, equal to $70,000, were consumed.

The gold is washed with hot water on the filter during the eighth day, and until it is sweet, (say by 7 P.M.) The filter consists of two layers of tolerably stout coarse muslin, with thick paper between, in a tub with a false bottom, 2½ feet in diameter and 2½ feet deep, and mounted on wheels. One of the men remains, after washing hours, until 7 P.M., when the watchman of the parting-room continues washing the gold and silver until sweet, *i. e.*, until the wash-water ceases to color blue litmus paper. Early on the ninth day the wet gold is pressed with a powerful hydraulic press, and the cakes then thoroughly dried on an iron pan, at a low red heat. This process saves wastage in the melting-pot, since there is no water remaining in the pressed metal to carry off gold in its steam. The same day (ninth) the gold is usually melted with a less proportion of copper than is requisite to make standard metal, and cast into bars, which are assayed by noon on the tenth. They are then melted with the proper quantity of copper, partly on the same day, partly early on the eleventh, and assayed and delivered to the coiner the same day. On the fourteenth they are ready for delivery to the treasurer as coins.

The silver solution drawn off from the pots is precipitated in a large wooden vat of 10 feet diameter by 5 feet deep, and the chloride of silver immediately run out into large filters [6 × 3 × 14] where it is washed sweet. The filter is covered with coarse muslin, and the first turbid water thrown back; the filter, which is on wheels, is then run over to the reducing vats, and the chloride shovelled into them. There are four such vats [7 × 4 × 2] made of wood and lined with lead, 1 inch thick in the bottom. A large excess of granulated zinc is thrown on the moist chloride in the vats, without the addition of acid; the reduction is very violent, and when it slackens, oil of vitriol is added to remove the excess of zinc. The whole reduction occupies a few hours, and after a night's repose the solution of mixed sulphate and chloride of zinc is run off into the sewer.

About 2 tons of zinc per $1,000,000 of gold are employed; the silver, however, in this amount, say 10 per cent. by weight, should only take,

by equivalents, about 2400 lbs., so that nearly 2 equivalents of zinc for 1 equivalent of silver are used. This is found to be advantageous, as both time and space are greatly economized by this excess.

The day after the reduction the reduced silver is washed, and the second day it is pressed and dried by heat, the same hydraulic press as for gold being used, but with different drying-pans. The same silver is used again for making fresh granulations, but as it accumulates from the Californian gold, 10,000 or 20,000 ounces are now and then made into coin, great care being taken in this case to avoid getting gold in it when drawing off the silver solution, and in the press.

Such are the actual working details in refining a specified amount ($2,000,000) of gold, the first-third of which is delivered as coin in fourteen days after its arrival, and the third third in eighteen days.

But as there is a bullion-fund of $5,500,000 allowed by government, depositors are paid from the third to the fifth day after an arrival, *i. e.*, as soon as the gold is melted, assayed, and its value calculated. When two heavy arrivals occur in close succession, the time of refining and coining can be shortened from 14 to 10 days.

The number of men engaged in the refining department is 14: 1 foreman, 8 for the parting process, 3 for reducing, and 2 for pressing and drying. In the gold melting-room there are 3 melters and 2 assistants. The total number of hands in the melting and refining departments is 34, including a melting and parting foreman, and 3 in the place for grinding, sifting, washing, and sweeping. This last place or sweep, embraces all pots, ashes of fires, trimmings of furnaces, ashes of all wood-work, &c.

The late law for reducing the weight of silver coin necessitated an increase of force, and 15 more were in consequence employed for this purpose. While $50,000,000 in a year have been parted with the above force, they could with the same force and apparatus refine $80,000,000 if it were required.

After many experiments upon anthracite, Professor Booth stated that he had at length fully succeeded in employing it for melting both gold and silver in the same furnaces, slightly modified, in which he had been accustomed to melt with charcoal. This change had been accompanied by great economy in the cost of material and labor, and by greater comfort to the workmen, from being less exposed to heat. The cost of charcoal (of the best quality—hard pine-knot coal) is 16 cents per bushel, delivered at the Mint; and while the cost of this fuel for all their operations in 1852, when gold was chiefly refined and melted, was about $7000, the cost of anthracite will be from $600 to $1000. In using the anthracite, he found that a simple draft of air, without a blast, was quite sufficient to sustain combustion.

Californian gold frequently contains the alloy "iridosmine," which is not always detected by the assay. In order to remove it as far as possible without actually dissolving gold, it is allowed to subside, first in the granulating crucibles, and then in the crucibles for toughening (melting fine gold and copper). If the assayers report its presence in the toughened bars, they are again melted, and the iridosmine allowed to subside. By these three, and often four successive meltings, the gold

is separated from its troublesome companion as far as practicable. The gold thus refined, and reduced to the proper standard, [*Section* 8: "And be it further enacted, that the standard for both gold and silver coins of the United States shall hereafter be such, that of 1000 parts by weight, 900 shall be of pure metal and 100 of alloy; and the alloy of silver coins shall be of copper, and the alloy of gold coins shall be of copper and silver; provided that the silver does not exceed one-half of the whole alloy,"] is delivered over to the chief coiner in the form of bars or ingots of a certain weight, to be divided and shaped into pieces required for the currency of the country.

The *Coining* department of the establishment is of a power and efficiency sufficient to perform all the mechanical processes incidental to the issue of nearly 70,000,000 of pieces during the past year; and I was assured by Mr. Franklin Peale, the chief coiner, that it could have executed much more if it had been steadily employed, or fully supplied with material during the whole of that period. It is not necessary to go through the whole course of operations in this department, but to notice only such as possess novelty or present special characteristics.

The necessary power for working the machinery is obtained from a large steam-engine of the form usually known as the steeple-engine; it is a double vertical high-pressure engine, with cranks at right angles, the power being carried off by a caoutchouc belt, 2 feet wide, from a drum of 8 feet in diameter; the estimated power is equal to 90 horses. At times, this is all required, at others much less is sufficient, and in uncertain proportions; to meet this irregularity, and to ensure that steadiness of motion so necessary in such delicate operations, a governor and throttle-valve of a peculiar construction have been devised, which have now been in use for some time, and have produced most satisfactory results, fully effecting the purpose for which they were designed. The rolling mills, four in number, are driven by belts, at the rate of six revolutions per minute; the distances between the rollers being adjusted by double wedges, moved by a train of wheels which are connected with a dial-plate and bands, divided and numbered into hours and minutes, so as to indicate the proper thickness of the strips of metal without the use of gauges. Gold strips are heated in an iron heater by steam, and waxed with a cloth dipped in melted wax, and the silver strips are coated with tallow by means of a brush. The draw bench is used for both metals, and trial pieces are cut from every strip and their weight tested, preparatory to the cutting of the whole.

The cutting processes are very simple and efficient, consisting of a shaft moved by pulleys, and a 2½-inch belt, with a fly-wheel of small diameter but sufficient in momentum to drive the punch through the slip of metal by means of an eccentric of ⅜-inch, at the rate of 250 pieces per minute, which skilled hands can readily accomplish and continue until the slip is exhausted. The annealing during the rolling of the ingots into slips is performed in copper cases, in muffles of fire-clay and brick, heated by anthracite coal, three muffles or hearths being kept at a bright red heat by one fire-grate or furnace, and the distribution and intensity regulated by dampers. These annealing furnaces are recent in their construction and very satisfactory in operation; they are heated by anthra-

5*

cite at the cost of about one-fourth the expense of the wood previously employed.

The whitening of planchets is performed as usual by inclosing the gold in luted boxes, and by exposing the silver in an open pan, to the heat of a simple furnace with wood fuel; the drying and sifting after the action of dilute sulphuric acid, is rapidly and effectually accomplished by a rolling screen—one portion of which consisting of a pair of closed concentric cylinders, between which high-pressure steam is admitted. The blanks, with a sufficient quantity of light wood saw-dust (linden or bass wood is the best), being introduced into the interior cylinder, a revolving motion is given to it by the engine for a certain time; the door is then opened and the blanks and saw-dust gradually find their way into the wire screen, by which they are separated, the movement being continued until the separation is complete, when the blanks are discharged at the end of the machine. An arrangement exists by which a slight inclination is given to the machine so as to direct the motion of the blanks towards the discharging end.

The milling machines are, I was informed, peculiar to this mint, and are in a great measure original, the operation being performed by a continuous rotary motion, with great rapidity and perfect efficiency, varying in rate according to the denomination of the coin, between 200 and 800 pieces per minute, and at the same time separating any pieces that are notably imperfect.

It must be understood that the operation here termed "milling," is merely for the purpose of thickening and preparing the edge, so as to give a better and more protective border to the coin, the ornament or reed, commonly known I believe in this country as "milling," being given to the piece by the reeded collar of the die in which the piece is struck.

The coining presses, 10 in number, and milling machines are worked by a high-pressure horizontal steam-engine, made from the design and under the direction of the present chief coiner, in the workshops of the establishment, in 1838.

The presses are three sizes, the largest applicable to the striking of silver dollars and double eagles:—the second to pieces of medium value:—and the smallest to the dime, half dime, and 3-cent pieces. The first is usually run at the rate of 80 per minute, the last at 104 per minute,—the average rate of the whole is 82 per minute. This rate can be increased if required.

If all the presses were employed in coinage at the usual rate, they would strike in one day (9 working hours) 439,560 pieces; and if employed upon gold, silver, and copper, in the usual manner, and on the usual denomination of coin, they would amount in value to $966,193.

During the past year, on one occasion, 8 of the presses were run 22 out of 24 consecutive hours, and coined in that time 814,000 pieces of different denominations of coin.

These presses have been made principally in the workshops of the Mint. They possess in common with the presses of Uhlhorn, in Germany, and Thouellier, in Paris, the advantage of "the progression lever," "le genou" or "toggle joint," a mechanical power admirably adapted to this

operation; but in almost every other particular they are original in arrangement, being the result of experience, beginning as far back as 1836.

In order to supply these presses, various means have been devised; among them, and not the least important, is the "shaking box," in which advantage is taken of a disposition observable in similar bodies, or bodies of similar form, to arrange themselves in similar positions. This is a box, whose bottom is constructed with parallel grooves adapted to the size of the blanks or planchets to be arranged. A quantity of them is thrown indiscriminately into the box, which is then quickly shaken in the direction of the grooves, the pieces immediately lay themselves side by side, in parallel rows, from which they can easily be lifted in roleaux as required to be passed to the feeding tubes of the mills or presses.

It is very evident to all visiting the establishment that such a large number of pieces could not be coined and manipulated by such a limited number of hands without the aid of some labor-facilitating arrangements, one of the most worthy of remark of which is, the method of counting the pieces coined—if counting it can be called, for in principle it is a measuring machine. The arrangement of this counting frame, or tray, may be understood from the following sketch of its construction:

A board or tray of such dimensions as may be required, is divided by a given number of parallel metallic plates dissected into its plane and slightly elevated above it, the edges of which rise no higher than the thickness of the coin for which it is intended. The board is of such a length as will admit of a few more than the required number of pieces to be laid longitudinally in the rows, and is divided across and at right angles with the rows, and hinged at a point opposite to a given number. One of those employed by this department, counted 1000 pieces, that is to say, it had 25 parallel grooves or rows sufficently long to receive 45 pieces. Now, having thrown on this board a large excess of pieces, it is agitated by shaking until all the grooves are filled, and then inclined forwards until all the surplus pieces have slid off, one layer only being retained by the metallic ledge; the hinged division is then suffered to fall, which at once throws off all but the 45 pieces in the length of each row. This operation, somewhat difficult and tedious to describe, is performed in a few seconds, and results in retaining on the board 1000 pieces, each piece exposed to inspection, and the whole accurately counted without the wearisome attention—so likely to result in error—required under usual circumstances.

The very large number of pieces coined during the last year has been counted exclusively by two female manipulators, assisted by a man who had the duty of weighing them in addition as a testing check. The same amount of labor by ordinary means could not have been performed with fewer than thirty or forty hands, to say nothing of inferior accuracy. This machine was originally arranged and patented by the late R. Tyler, coiner of the New Orleans Branch Mint, but materially improved in its application and construction by Mr. Franklin Peale.

The balances of the Mint of the United States have received the attention necessary to an instrument of such importance in mint operations. They have been arranged and made generally in the workshops of the establishment, and operate entirely to the satisfaction of the department.

It is not necessary to enter into details of their construction, as a full and minute description is given in the *Journal of the Franklin Institute* for July, 1847. I, perhaps, ought to mention that since that appeared, some slight improvements have been made by inclosing all but the stirrups and pans in glass, by these means excluding dust and protecting them from the influence of air currents.

In concluding this brief sketch of the practical working of the two most important departments of the United States Mint, I cannot omit a reference to the very excellent remarks of the chief coiner on the employment of females in some of the operations in his department. This, he informed me, had generally excited the surprise of, and been commented upon, by foreigners, who had visited the Mint. His experience, however, had led him to believe, that in places of trust, where no great physical exertion was called for, but where accuracy and strict integrity were of first importance, the moral perceptions of the female, generally stronger and of a higher standard than in the man, would qualify her as his substitute, and thus, while opening a new field of labor for the occupation of females, would strengthen their claims to it by the superior accuracy and economy of their work.

For the Journal of the Franklin Institute.

The Mammoth Steamer of Great Britain.

The following comprise most of the essential elements of this monster iron vessel, building by Messrs. Scott Russell & Co., for the Eastern Steam Navigation Company:

Length,	675 feet.
Beam,	83 "
Depth of hold,	60 "
Draft of water at load line,	30 "

This vessel is to be propelled by four steam engines, two of them connected with side water wheels, and two with a screw propeller.

The water wheel engines are to be of 1000 horses; oscillating cylinders, 74 inches diameter, by 14 feet stroke of piston.

The screw engines are to be of 1500 horses, 84 inch cylinder, and are to be made by Messrs. Bolton & Watt.

The boilers will have 100 furnaces.

The hull is divided into water-tight compartments of 60 feet. The weight of plates will be 10,000 tons, and the number of rivets 3,000,000. The plates at bottom are to be one inch thick, and three-quarters at sides and top.

The frame is to be plated within as well as outside the ribs, up to the water line.

Water wheels are to be 60 feet in diameter.

Vessel to accommodate 600 first class and 2000 second and third class passengers, and to carry 12,000 tons of coal. C. H. H.

For the Journal of the Franklin Institute.

Particulars of the Steamboat Cuba.

Hull built by Samuel Sneden, Greenpoint, L. I.; Machinery by Pease & Murphy, New York; Intended service, Mobile to New Orleans.

Hull.—		
Length on deck, from fore part of stem to after part of stern post, above the spar deck,		250 feet.
Breadth of beam at midship section,		32 " 8 inches.
Depth of hold,		9 "
Draft of water at load line,		6 " 6 "
" " below pressure and revolutions,		6 "
Tonnage, custom-house,	800.	
Masts and rig,	foresail and jib.	
Engine—Vertical beam.		
Diameter of cylinder,		56 inches.
Length of stroke,		10 feet.
Maximum pressure of steam in pounds,	80.	
Cut off,	$\frac{5}{8}$.	
Maximum revolutions per minute,	18.	
Boiler—One—Flued.		
Length of boiler,		35 feet.
Breadth "		13 " 9 inches.
Height " exclusive of steam chimney,		13 " 3 "
Number of furnaces,	3.	
Breadth of "		3 " $8\frac{1}{2}$ "
Length of grate bars,		7 " 8 "
Number of upper flues,	6.	
Internal diameter of flues,		19 and 21 ins.
Heating surface, (fire and flues,)		17[illegible] sq. feet.
Diameter of smoke pipes,		[illegible] feet.
Height "		36 "
Description of fuel,	wood.	
Combustion,	Natural draft.	
Paddle Wheels.—		
Diameter,		30 feet.
Length of blades,		8 "
Depth "		2 " 2 inches.
Number "	28.	

Remarks.—Floor timbers at throat, *molded*, 15 inches;—*sided*, 5 inches;—distance of frames *apart at centres*, 24 inches. Frame strapped with diagonal and double laid iron straps 4 by $\frac{1}{2}$ inch. C. H. H.

For the Journal of the Franklin Institute.

Particulars of the Steam Tug Leviathan.

The following particulars possess more than ordinary interest, inasmuch as they contain the exact dimensions and reliable elements of performance of the fastest sea steamer in American waters; and if this statement should appear unreasonable to any one, he is referred to the cross area of a single run of her water wheel blades compared to her midship section, which bears the relation of 39 to 176, and this, too, with a velocity given to their periphery of 23 statute miles per hour; the deduction to be made from this for slip of wheel, is left to your profes-